

Original Research

Comparative Analysis of Effect of General and Spinal Anesthesia on Renal Functions and Hemodynamic Profile Among Patients Undergoing Cesarean Section

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ABSTRACT

Background: In recent years, a number of factors have been under consideration as possible influences on the rising cesarean rate. General anaesthetics (GAs) have been in use since the mid-19th century. Spinal anesthesia is a simple technique that provides a deep and fast surgical block through the injection of small doses of local anesthetic solution into the subarachnoid space. Hence, the present study was conducted to compare the effect of general and spinal anesthesia on renal functions and hemodynamic profile among patients undergoing cesarean section.

Materials & Methods: 100 patients scheduled to undergo cesarean section were enrolled. A Performa was made and complete demographic and clinical details of all the patients was obtained. All the patients were randomized into two study groups: Group A: Spinal anesthesia group, and Group B: General anesthesia group. All the patients underwent cesarean Section according to anesthesia of their respective study groups. Blood samples were obtained preoperatively, and postoperative and renal profile was evaluated and compared. The hemodynamic profile was monitored at regular intervals and was compared among the two study groups.

Results: Mean age of the patients of group A and group B was 43.5 years and 40.8 years respectively. Majority proportion of patients of both the study groups were males. The hemodynamic profile showed a significant variation among patients of group A in comparison to patients of group B. However, while comparing the renal profile among patients of the two study groups, non-significant results were obtained.

Conclusion: Both general and spinal anesthesia didn't alter renal profile; however, spinal anesthesia had significant effect on hemodynamic profile in comparison to general anesthesia.

Keywords: General, Spinal, Renal, Hemodynamic.

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INTRODUCTION

In recent years, a number of factors have been under consideration as possible influences on the rising cesarean rate. Changing risk profiles among increasingly older primiparae are often cited as a reason

for the rise in cesarean deliveries. An increase in maternal request cesarean sections also plays a part. However, the rise in cesarean section rates should not be viewed in isolation from changes in society.^{1,2} On the contrary, financial, social, and cultural elements appear

to play an important part. These factors—taken together with the public perception that a cesarean delivery is now an almost risk-free procedure—might well be contributing to the rise in the number of cesarean sections performed.^{3,4}Cesarean sections have been classified in various ways by different perspectives. According to urgency, they are classified either as elective or emergency. According to technique, they have been classified as classical, lower uterine segment and cesarean hysterectomy. Intentional transvesical cesarean though not a routinely practiced technique is used for delivery in women born with imperforate anus, ectopic intravaginal urethra, vaginal and urethral strictures, and bladder adherent completely over the uterus.^{5,6}General anaesthetics (GAs) have been in use since the mid-19th century. The first such drugs were chloroform and ether. Over time, more chemicals were found to have general anaesthetic action. Towards the middle of the 20th century, the haloalkane gaseous GAs were synthesized, and they have remained the family of GA drugs most widely used. GAs comprise one of the most important drug groups in clinical use. Without them, modern medicine, especially surgery, would not have been possible. Spinal anesthesia is a simple technique that provides a deep and fast surgical block through the injection of small doses of local anesthetic solution into the subarachnoid space.^{7,8}Hence; the present study was conducted to compare the effect of general and spinal anesthesia on renal functions and hemodynamic profile among patients undergoing cesarean section.

MATERIALS & METHODS

The present study was conducted to compare the effect of general and spinal anesthesia on renal functions and hemodynamic profile among patients undergoing cesarean section. A total of 100 patients scheduled to undergo cesarean section were enrolled. A Performa was made and complete demographic and clinical details of all the patients were obtained. All the patients were randomized into two study groups:

Group A: Spinal anesthesia group, and

Group B: General anesthesia group

All the patients underwent cesarean section according to anesthesia of their respective study groups. Blood samples were obtained preoperatively, and postoperative and renal profile was evaluated and compared. The hemodynamic profile was monitored at regular intervals and was compared among the two study groups. All the results were recorded on a Microsoft excel sheet and were subjected to statistical analyses using SPSS software. Chi-square test and student t test were used for evaluation of level of significance.

RESULTS

The mean age of the patients of group A and group B was 43.5 years and 40.8 years respectively. Majority proportion of patients of both the study groups were males. The hemodynamic profile showed a significant variation among patients of group A in comparison to patients of group B. However, while comparing the renal profile among patients of the two study groups, non-significant results were obtained.

Table 1: Comparison of hemodynamic variables

Hemodynamic variable		Group A	Group B	p-value
Systolic blood pressure	Before anesthesia	118.3	120.7	0.81
	24 hours after anesthesia	106.2	118.4	0.00*
Diastolic blood pressure	Before anesthesia	78.5	81.8	0.11
	24 hours after anesthesia	72.9	79.1	0.00*
Heart rate	Before anesthesia	82.5	83.5	0.76
	24 hours after anesthesia	79.1	78.5	0.53

*: Significant

Table 2: Comparison of renal profile

Renal profile		Group A	Group B	p-value
Serum creatinine (mg/dL)	Before anesthesia	51.23	49.52	0.28
	24 hours after anesthesia	58.12	57.58	0.12

DISCUSSION

Cesarean deliveries have risen significantly over the past decades due to advanced maternal age, defensive obstetric practice, medicolegal concerns and maternal request. CS is a surgical procedure including some risks such as uterine rupture, infection, hemorrhage, thrombosis and damage to the bladder, ureters or bowel.

Although CS is now safe along with developments in anesthesia and surgery, these complications of CS can be life-threatening for both mother and baby. Compared with primary CS, multiple repeat caesarean sections (MRCS) are associated with additional risks including placenta previa, abnormal placental invasion and difficulties in surgical dissection.⁷⁻⁹Hence; the present

study was conducted to compare the effect of general and spinal anesthesia on renal functions and hemodynamic profile among patients undergoing cesarean section. The mean age of the patients of group A and group B was 43.5 years and 40.8 years respectively. Majority proportion of patients of both the study groups were males. The hemodynamic profile showed a significant variation among patients of group A in comparison to patients of group B. However, while comparing the renal profile among patients of the two study groups, non-significant results were obtained. Milosavljevic SB et al determined the significance of spinal anesthesia in the suppression of the metabolic, hormonal, and hemodynamic response to surgical stress in elective surgical patients compared to general anesthesia. They also examined how the different techniques of anesthesia affect these hemodynamic parameters: systolic arterial pressure (AP), diastolic AP, heart rate (HR), and arterial oxygen saturation (SpO₂). These parameters were measured before induction on anesthesia (T1), 30 min after the surgical incisions (T2), 1 h postoperatively (T3) and 24 h after surgery (T4). Serum cortisol levels were significantly higher in the general anesthesia group compared to the spinal anesthesia group ($p < 0.01$). Glycemia was significantly higher in the general anesthesia group ($p < 0.05$). There was a statistically significant, positive correlation between serum cortisol levels and glycemia at all times observed ($p < 0.01$). Systolic and diastolic AP did not differ significantly between the groups ($p = 0.191$, $p = 0.101$). The HR was significantly higher in the general anesthesia group ($p < 0.01$). SpO₂ values did not differ significantly between the groups ($p = 0.081$). Based on metabolic, hormonal, and hemodynamic responses, spinal anesthesia proved more effective than general anesthesia in suppressing stress response in elective surgical patients.¹⁰ Iles C et al assessed the SSI (surgical stress index) in patients undergoing regional anaesthesia either alone or combined with sedation compared with patients undergoing general anaesthesia (GA). Seventy-one patients undergoing general (n=24) or spinal anaesthesia with (n=24) or without sedation (n=23) were included. The SSI was higher in patients undergoing spinal anaesthesia [mean 65, CI (59.3-70.5)] compared with GA [48 (39.9-56.4), $P < 0.01$], and baseline [41 (37.3-44.2), $P < 0.001$]. During spinal anaesthesia with sedation [44 (36.2-50.9)], it was comparable with the baseline level ($P > 0.05$). In comparison with baseline, SSI in the recovery room was higher in patients after GA [59 (48.4-67.9), $P < 0.025$] but not after spinal anaesthesia [53 (47.6-

60.1), $P > 0.05$] or after spinal anaesthesia with sedation [54 (45.8-65.1), $P > 0.05$]. Changes of the SSI were not reflected by changes of haemodynamic variables. In fully awake patients under spinal anaesthesia, the SSI does not reflect the nociception-antinociception balance.¹¹

CONCLUSION

Both general and spinal anesthesia didn't alter renal profile; however, spinal anesthesia had significant effect on hemodynamic profile in comparison to general anesthesia.

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